

# 74HC153; 74HCT153

## Dual 4-input multiplexer

Rev. 8 — 13 August 2019

Product data sheet

## 1. General description

The 74HC153; 74HCT153 is a dual 4-input multiplexer. The device features independent enable inputs ( $\overline{nE}$ ) and common data select inputs (S0 and S1). For each multiplexer, the select inputs select one of the four binary inputs and routes it to the multiplexer output ( $nY$ ). A HIGH on  $\overline{E}$  forces the corresponding multiplexer outputs LOW. Inputs include clamp diodes. This enables the use of current limiting resistors to interface inputs to voltages in excess of  $V_{CC}$ .

## 2. Features and benefits

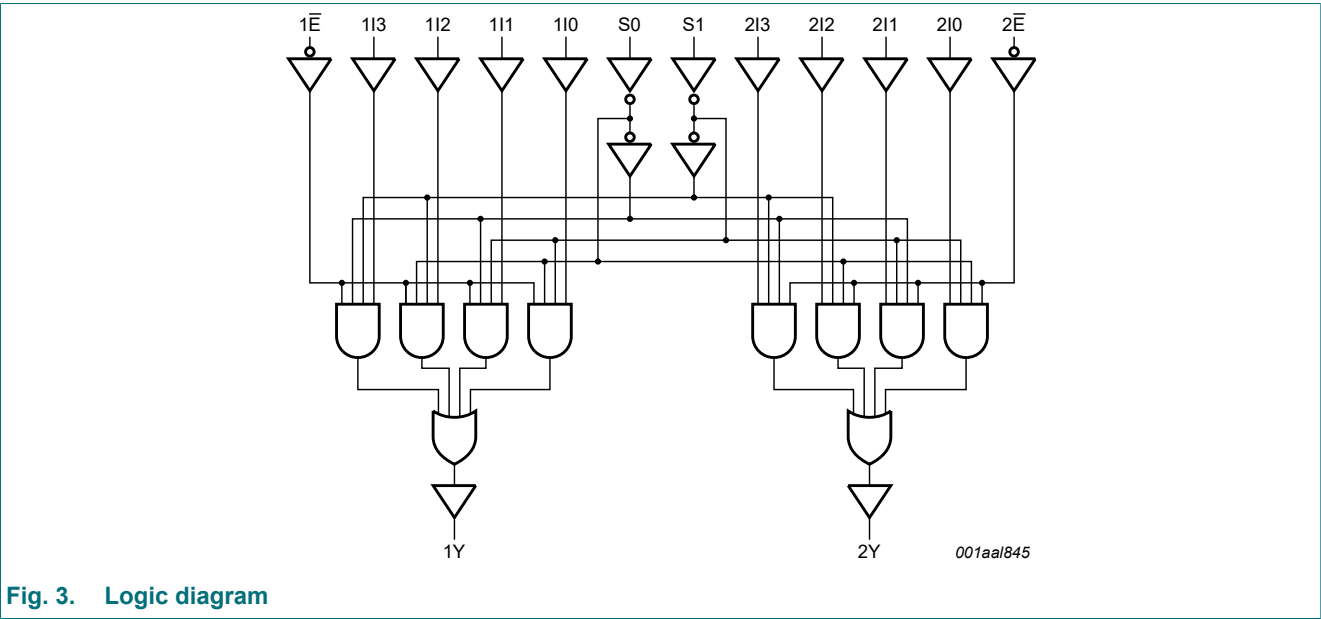
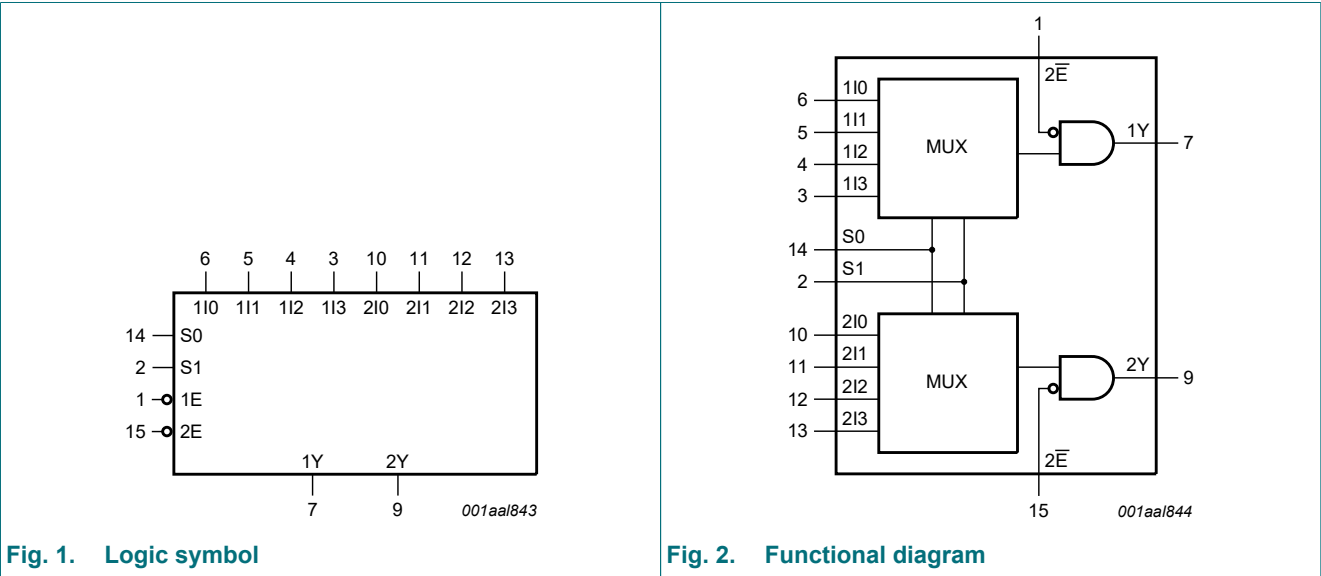
- Input levels:
  - For 74HC153: CMOS level
  - For 74HCT153: TTL level
- Non-inverting outputs
- Separate enable input for each output
- Common select inputs
- Complies with JEDEC standard no. 7A
- Permits multiplexing from n lines to 1 line
- Enable line provided for cascading (n lines to 1 line)
- ESD protection:
  - HBM JESD22-A114F exceeds 2000 V
  - MM JESD22-A115-A exceeds 200 V
- Multiple package options
- Specified from -40 °C to +85 °C and -40 °C to +125 °C.

## 3. Ordering information

Table 1. Ordering information

| Type number | Package           |         |                                                                           |          |
|-------------|-------------------|---------|---------------------------------------------------------------------------|----------|
|             | Temperature range | Name    | Description                                                               | Version  |
| 74HC153D    | -40 °C to +125 °C | SO16    | plastic small outline package; 16 leads;<br>body width 3.9 mm             | SOT109-1 |
| 74HCT153D   |                   |         |                                                                           |          |
| 74HC153DB   | -40 °C to +125 °C | SSOP16  | plastic shrink small outline package; 16 leads;<br>body width 5.3 mm      | SOT338-1 |
| 74HCT153DB  |                   |         |                                                                           |          |
| 74HC153PW   | -40 °C to +125 °C | TSSOP16 | plastic thin shrink small outline package;<br>16 leads; body width 4.4 mm | SOT403-1 |
| 74HCT153PW  |                   |         |                                                                           |          |

4. Functional diagram



5. Pinning information

5.1. Pinning

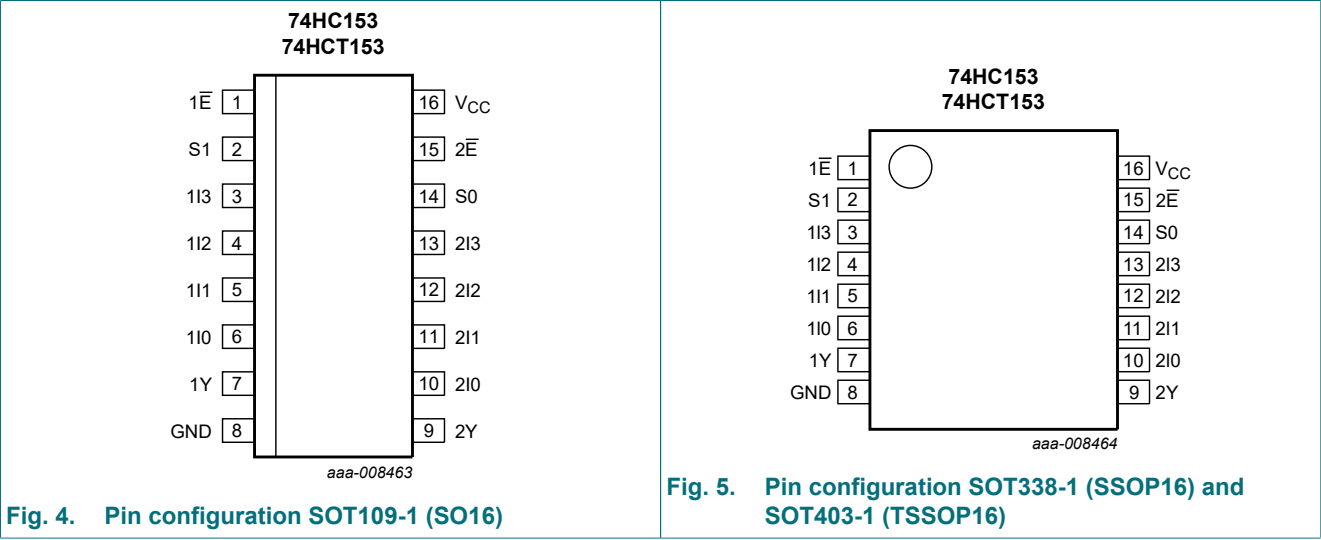


Fig. 4. Pin configuration SOT109-1 (SO16)

Fig. 5. Pin configuration SOT338-1 (SSOP16) and SOT403-1 (TSSOP16)

5.2. Pin description

Table 2. Pin description

| Symbol             | Pin            | Description                       |
|--------------------|----------------|-----------------------------------|
| 1E, 2E             | 1, 15          | output enable inputs (active LOW) |
| S0, S1             | 14, 2          | data select inputs                |
| 1I0, 1I1, 1I2, 1I3 | 6, 5, 4, 3     | data inputs source 1              |
| 1Y                 | 7              | multiplexer output source 1       |
| GND                | 8              | ground (0 V)                      |
| 2Y                 | 9              | multiplexer output source 2       |
| 2I0, 2I1, 2I2, 2I3 | 10, 11, 12, 13 | data inputs source 2              |
| VCC                | 16             | supply voltage                    |

## 6. Functional description

**Table 3. Function table**

*H = HIGH voltage level; L = LOW voltage level; X = don't care.*

| select inputs |    | data inputs |     |     |     | output enable    | output |
|---------------|----|-------------|-----|-----|-----|------------------|--------|
| S0            | S1 | nl0         | nl1 | nl2 | nl3 | n $\overline{E}$ | nY     |
| X             | X  | X           | X   | X   | X   | H                | L      |
| L             | L  | L           | X   | X   | X   | L                | L      |
| L             | L  | H           | X   | X   | X   | L                | H      |
| H             | L  | X           | L   | X   | X   | L                | L      |
| H             | L  | X           | H   | X   | X   | L                | H      |
| L             | H  | X           | X   | L   | X   | L                | L      |
| L             | H  | X           | X   | H   | X   | L                | H      |
| H             | H  | X           | X   | X   | L   | L                | L      |
| H             | H  | X           | X   | X   | H   | L                | H      |

## 7. Limiting values

**Table 4. Limiting values**

*In accordance with the Absolute Maximum Rating System (IEC 60134). Voltages are referenced to GND (ground = 0 V).*

| Symbol           | Parameter               | Conditions                                                              | Min  | Max  | Unit |
|------------------|-------------------------|-------------------------------------------------------------------------|------|------|------|
| V <sub>CC</sub>  | supply voltage          |                                                                         | -0.5 | +7   | V    |
| I <sub>IK</sub>  | input clamping current  | V <sub>I</sub> < -0.5 V or V <sub>I</sub> > V <sub>CC</sub> + 0.5 V [1] | -    | ±20  | mA   |
| I <sub>OK</sub>  | output clamping current | V <sub>O</sub> < -0.5 V or V <sub>O</sub> > V <sub>CC</sub> + 0.5 V [1] | -    | ±20  | mA   |
| I <sub>O</sub>   | output current          | -0.5 V < V <sub>O</sub> < V <sub>CC</sub> + 0.5 V                       | -    | ±25  | mA   |
| I <sub>CC</sub>  | supply current          |                                                                         | -    | 50   | mA   |
| I <sub>GND</sub> | ground current          |                                                                         | -50  | -    | mA   |
| T <sub>stg</sub> | storage temperature     |                                                                         | -65  | +150 | °C   |
| P <sub>tot</sub> | total power dissipation | [2]                                                                     | -    | 500  | mW   |

[1] The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

[2] For SOT109-1 (SO16) packages: P<sub>tot</sub> derates linearly with 12.4 mW/K above 110 °C.

For SOT338-1 (SSOP16) packages: P<sub>tot</sub> derates linearly with 8.5 mW/K above 91 °C.

For SOT403-1 (TSSOP16) packages: P<sub>tot</sub> derates linearly with 8.5 mW/K above 91 °C.

## 8. Recommended operating conditions

**Table 5. Recommended operating conditions**

Voltages are referenced to GND (ground = 0 V)

| Symbol           | Parameter                           | Conditions              | 74HC153 |      |                 | 74HCT153 |      |                 | Unit |
|------------------|-------------------------------------|-------------------------|---------|------|-----------------|----------|------|-----------------|------|
|                  |                                     |                         | Min     | Typ  | Max             | Min      | Typ  | Max             |      |
| V <sub>CC</sub>  | supply voltage                      |                         | 2.0     | 5.0  | 6.0             | 4.5      | 5.0  | 5.5             | V    |
| V <sub>I</sub>   | input voltage                       |                         | 0       | -    | V <sub>CC</sub> | 0        | -    | V <sub>CC</sub> | V    |
| V <sub>O</sub>   | output voltage                      |                         | 0       | -    | V <sub>CC</sub> | 0        | -    | V <sub>CC</sub> | V    |
| T <sub>amb</sub> | ambient temperature                 |                         | -40     | +25  | +125            | -40      | +25  | +125            | °C   |
| Δt/ΔV            | input transition rise and fall rate | V <sub>CC</sub> = 2.0 V | -       | -    | 625             | -        | -    | -               | ns/V |
|                  |                                     | V <sub>CC</sub> = 4.5 V | -       | 1.67 | 139             | -        | 1.67 | 139             | ns/V |
|                  |                                     | V <sub>CC</sub> = 6.0 V | -       | -    | 83              | -        | -    | -               | ns/V |

## 9. Static characteristics

**Table 6. Static characteristics**

At recommended operating conditions; voltages are referenced to GND (ground = 0 V).

| Symbol          | Parameter                 | Conditions                                                                             | 25 °C |      |      | -40 °C to +85 °C |      | -40 °C to +125 °C |      | Unit |
|-----------------|---------------------------|----------------------------------------------------------------------------------------|-------|------|------|------------------|------|-------------------|------|------|
|                 |                           |                                                                                        | Min   | Typ  | Max  | Min              | Max  | Min               | Max  |      |
| 74HC153         |                           |                                                                                        |       |      |      |                  |      |                   |      |      |
| V <sub>IH</sub> | HIGH-level input voltage  | V <sub>CC</sub> = 2.0 V                                                                | 1.5   | 1.2  | -    | 1.5              | -    | 1.5               | -    | V    |
|                 |                           | V <sub>CC</sub> = 4.5 V                                                                | 3.15  | 2.4  | -    | 3.15             | -    | 3.15              | -    | V    |
|                 |                           | V <sub>CC</sub> = 6.0 V                                                                | 4.2   | 3.2  | -    | 4.2              | -    | 4.2               | -    | V    |
| V <sub>IL</sub> | LOW-level input voltage   | V <sub>CC</sub> = 2.0 V                                                                | -     | 0.8  | 0.5  | -                | 0.5  | -                 | 0.5  | V    |
|                 |                           | V <sub>CC</sub> = 4.5 V                                                                | -     | 2.1  | 1.35 | -                | 1.35 | -                 | 1.35 | V    |
|                 |                           | V <sub>CC</sub> = 6.0 V                                                                | -     | 2.8  | 1.8  | -                | 1.8  | -                 | 1.8  | V    |
| V <sub>OH</sub> | HIGH-level output voltage | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>                                    |       |      |      |                  |      |                   |      |      |
|                 |                           | I <sub>O</sub> = -20 μA; V <sub>CC</sub> = 2.0 V                                       | 1.9   | 2.0  | -    | 1.9              | -    | 1.9               | -    | V    |
|                 |                           | I <sub>O</sub> = -20 μA; V <sub>CC</sub> = 4.5 V                                       | 4.4   | 4.5  | -    | 4.4              | -    | 4.4               | -    | V    |
|                 |                           | I <sub>O</sub> = -20 μA; V <sub>CC</sub> = 6.0 V                                       | 5.9   | 6.0  | -    | 5.9              | -    | 5.9               | -    | V    |
|                 |                           | I <sub>O</sub> = -4.0 mA; V <sub>CC</sub> = 4.5 V                                      | 3.98  | 4.32 | -    | 3.84             | -    | 3.7               | -    | V    |
|                 |                           | I <sub>O</sub> = -5.2 mA; V <sub>CC</sub> = 6.0 V                                      | 5.48  | 5.81 | -    | 5.34             | -    | 5.2               | -    | V    |
| V <sub>OL</sub> | LOW-level output voltage  | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>                                    |       |      |      |                  |      |                   |      |      |
|                 |                           | I <sub>O</sub> = 20 μA; V <sub>CC</sub> = 2.0 V                                        | -     | 0    | 0.1  | -                | 0.1  | -                 | 0.1  | V    |
|                 |                           | I <sub>O</sub> = 20 μA; V <sub>CC</sub> = 4.5 V                                        | -     | 0    | 0.1  | -                | 0.1  | -                 | 0.1  | V    |
|                 |                           | I <sub>O</sub> = 20 μA; V <sub>CC</sub> = 6.0 V                                        | -     | 0    | 0.1  | -                | 0.1  | -                 | 0.1  | V    |
|                 |                           | I <sub>O</sub> = 4.0 mA; V <sub>CC</sub> = 4.5 V                                       | -     | 0.15 | 0.26 | -                | 0.33 | -                 | 0.4  | V    |
|                 |                           | I <sub>O</sub> = 5.2 mA; V <sub>CC</sub> = 6.0 V                                       | -     | 0.16 | 0.26 | -                | 0.33 | -                 | 0.4  | V    |
| I <sub>I</sub>  | input leakage current     | V <sub>I</sub> = V <sub>CC</sub> or GND; V <sub>CC</sub> = 6.0 V                       | -     | -    | ±0.1 | -                | ±1   | -                 | ±1   | μA   |
| I <sub>CC</sub> | supply current            | V <sub>I</sub> = V <sub>CC</sub> or GND; I <sub>O</sub> = 0 A; V <sub>CC</sub> = 6.0 V | -     | -    | 8.0  | -                | 80   | -                 | 160  | μA   |
| C <sub>I</sub>  | input capacitance         |                                                                                        | -     | 3.5  | -    | -                | -    | -                 | -    | pF   |

| Symbol           | Parameter                 | Conditions                                                                                                                                              | 25 °C |      |      | -40 °C to +85 °C |      | -40 °C to +125 °C |     | Unit |
|------------------|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------|------|------------------|------|-------------------|-----|------|
|                  |                           |                                                                                                                                                         | Min   | Typ  | Max  | Min              | Max  | Min               | Max |      |
| 74HCT153         |                           |                                                                                                                                                         |       |      |      |                  |      |                   |     |      |
| V <sub>IH</sub>  | HIGH-level input voltage  | V <sub>CC</sub> = 4.5 V to 5.5 V                                                                                                                        | 2.0   | 1.6  | -    | 2.0              | -    | 2.0               | -   | V    |
| V <sub>IL</sub>  | LOW-level input voltage   | V <sub>CC</sub> = 4.5 V to 5.5 V                                                                                                                        | -     | 1.2  | 0.8  | -                | 0.8  | -                 | 0.8 | V    |
| V <sub>OH</sub>  | HIGH-level output voltage | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ; V <sub>CC</sub> = 4.5 V                                                                           |       |      |      |                  |      |                   |     |      |
|                  |                           | I <sub>O</sub> = -20 µA                                                                                                                                 | 4.4   | 4.5  | -    | 4.4              | -    | 4.4               | -   | V    |
|                  |                           | I <sub>O</sub> = -4.0 mA                                                                                                                                | 3.98  | 4.32 | -    | 3.84             | -    | 3.7               | -   | V    |
| V <sub>OL</sub>  | LOW-level output voltage  | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ; V <sub>CC</sub> = 4.5 V                                                                           |       |      |      |                  |      |                   |     |      |
|                  |                           | I <sub>O</sub> = 20 µA; V <sub>CC</sub> = 4.5 V                                                                                                         | -     | 0    | 0.1  | -                | 0.1  | -                 | 0.1 | V    |
|                  |                           | I <sub>O</sub> = 5.2 mA; V <sub>CC</sub> = 6.0 V                                                                                                        | -     | 0.15 | 0.26 | -                | 0.33 | -                 | 0.4 | V    |
| I <sub>I</sub>   | input leakage current     | V <sub>I</sub> = V <sub>CC</sub> or GND; V <sub>CC</sub> = 5.5 V                                                                                        | -     | -    | ±0.1 | -                | ±1   | -                 | ±1  | µA   |
| I <sub>CC</sub>  | supply current            | V <sub>I</sub> = V <sub>CC</sub> or GND; I <sub>O</sub> = 0 A; V <sub>CC</sub> = 5.5 V                                                                  | -     | -    | 8    | -                | 80   | -                 | 160 | µA   |
| ΔI <sub>CC</sub> | additional supply current | per input pin; V <sub>I</sub> = V <sub>CC</sub> - 2.1 V; I <sub>O</sub> = 0 A; other inputs at V <sub>CC</sub> or GND; V <sub>CC</sub> = 4.5 V to 5.5 V |       |      |      |                  |      |                   |     |      |
|                  |                           | 1In, 2In                                                                                                                                                | -     | 45   | 162  | -                | 203  | -                 | 221 | µA   |
|                  |                           | n $\overline{E}$                                                                                                                                        | -     | 60   | 216  | -                | 270  | -                 | 294 | µA   |
|                  |                           | Sn                                                                                                                                                      | -     | 135  | 486  | -                | 608  | -                 | 662 | µA   |
| C <sub>I</sub>   | input capacitance         |                                                                                                                                                         | -     | 3.5  | -    | -                | -    | -                 | -   | pF   |

## 10. Dynamic characteristics

**Table 7. Dynamic characteristics**

$GND = 0\text{ V}$ ;  $t_r = t_f = 6\text{ ns}$ ;  $C_L = 50\text{ pF}$ ; for test circuit, see [Fig. 8](#); unless otherwise specified

| Symbol          | Parameter                     | Conditions                                               | 25 °C |     |     | -40 °C to +85 °C |     | -40 °C to +125 °C |     | Unit |
|-----------------|-------------------------------|----------------------------------------------------------|-------|-----|-----|------------------|-----|-------------------|-----|------|
|                 |                               |                                                          | Min   | Typ | Max | Min              | Max | Min               | Max |      |
| 74HC153         |                               |                                                          |       |     |     |                  |     |                   |     |      |
| t <sub>pd</sub> | propagation delay             | 1In to nY, 2In to nY; see Fig. 6 [1]                     |       |     |     |                  |     |                   |     |      |
|                 |                               | V <sub>CC</sub> = 2.0 V                                  | -     | 47  | 145 | -                | 180 | -                 | 220 | ns   |
|                 |                               | V <sub>CC</sub> = 4.5 V                                  | -     | 17  | 29  | -                | 36  | -                 | 44  | ns   |
|                 |                               | V <sub>CC</sub> = 5.0 V; C <sub>L</sub> = 15 pF          | -     | 14  | -   | -                | -   | -                 | -   | ns   |
|                 |                               | V <sub>CC</sub> = 6.0 V                                  | -     | 14  | 25  | -                | 31  | -                 | 38  | ns   |
|                 |                               | Sn to nY; see Fig. 7                                     |       |     |     |                  |     |                   |     |      |
|                 |                               | V <sub>CC</sub> = 2.0 V                                  | -     | 50  | 150 | -                | 190 | -                 | 225 | ns   |
|                 |                               | V <sub>CC</sub> = 4.5 V                                  | -     | 18  | 30  | -                | 38  | -                 | 45  | ns   |
|                 |                               | V <sub>CC</sub> = 5.0 V; C <sub>L</sub> = 15 pF          | -     | 15  | -   | -                | -   | -                 | -   | ns   |
|                 |                               | V <sub>CC</sub> = 6.0 V                                  | -     | 14  | 26  | -                | 33  | -                 | 38  | ns   |
|                 |                               | nE to nY; see Fig. 7                                     |       |     |     |                  |     |                   |     |      |
|                 |                               | V <sub>CC</sub> = 2.0 V                                  | -     | 33  | 100 | -                | 125 | -                 | 150 | ns   |
|                 |                               | V <sub>CC</sub> = 4.5 V                                  | -     | 12  | 20  | -                | 25  | -                 | 30  | ns   |
|                 |                               | V <sub>CC</sub> = 5.0 V; C <sub>L</sub> = 15 pF          | -     | 10  | -   | -                | -   | -                 | -   | ns   |
|                 |                               | V <sub>CC</sub> = 6.0 V                                  | -     | 10  | 17  | -                | 21  | -                 | 26  | ns   |
| t <sub>t</sub>  | transition time               | see Fig. 6 [2]                                           |       |     |     |                  |     |                   |     |      |
|                 |                               | V <sub>CC</sub> = 2.0 V                                  | -     | 19  | 75  | -                | 95  | -                 | 110 | ns   |
|                 |                               | V <sub>CC</sub> = 4.5 V                                  | -     | 7   | 15  | -                | 19  | -                 | 22  | ns   |
|                 |                               | V <sub>CC</sub> = 6.0 V                                  | -     | 6   | 13  | -                | 16  | -                 | 19  | ns   |
| C <sub>PD</sub> | power dissipation capacitance | per package; V <sub>I</sub> = GND to V <sub>CC</sub> [3] | -     | 30  | -   | -                | -   | -                 | -   | pF   |

| Symbol           | Parameter                     | Conditions                                                       | 25 °C |     |     | -40 °C to +85 °C |     | -40 °C to +125 °C |     | Unit |
|------------------|-------------------------------|------------------------------------------------------------------|-------|-----|-----|------------------|-----|-------------------|-----|------|
|                  |                               |                                                                  | Min   | Typ | Max | Min              | Max | Min               | Max |      |
| 74HCT153         |                               |                                                                  |       |     |     |                  |     |                   |     |      |
| t <sub>PHL</sub> | HIGH to LOW propagation delay | 1In to nY, 2In to nY; see <a href="#">Fig. 6</a> [1]             |       |     |     |                  |     |                   |     |      |
|                  |                               | V <sub>CC</sub> = 4.5 V                                          | -     | 19  | 34  | -                | 43  | -                 | 51  | ns   |
|                  |                               | V <sub>CC</sub> = 5.0 V; C <sub>L</sub> = 15 pF                  | -     | 16  | -   | -                | -   | -                 | -   | ns   |
| t <sub>PLH</sub> | LOW to HIGH propagation delay | 1In to nY, 2In to nY; see <a href="#">Fig. 6</a> [1]             |       |     |     |                  |     |                   |     |      |
|                  |                               | V <sub>CC</sub> = 4.5 V                                          | -     | 13  | 24  | -                | 30  | -                 | 36  | ns   |
|                  |                               | V <sub>CC</sub> = 5.0 V; C <sub>L</sub> = 15 pF                  | -     | 16  | -   | -                | -   | -                 | -   | ns   |
| t <sub>pd</sub>  | propagation delay             | Sn to nY; see <a href="#">Fig. 7</a> [1]                         |       |     |     |                  |     |                   |     |      |
|                  |                               | V <sub>CC</sub> = 4.5 V                                          | -     | 20  | 34  | -                | 43  | -                 | 51  | ns   |
|                  |                               | V <sub>CC</sub> = 5.0 V; C <sub>L</sub> = 15 pF                  | -     | 17  | -   | -                | -   | -                 | -   | ns   |
|                  |                               | nE to nY; see <a href="#">Fig. 7</a> [1]                         |       |     |     |                  |     |                   |     |      |
|                  |                               | V <sub>CC</sub> = 4.5 V                                          | -     | 14  | 27  | -                | 34  | -                 | 41  | ns   |
|                  |                               | V <sub>CC</sub> = 5.0 V; C <sub>L</sub> = 15 pF                  | -     | 11  | -   | -                | -   | -                 | -   | ns   |
| t <sub>t</sub>   | transition time               | see <a href="#">Fig. 6</a> [2]                                   |       |     |     |                  |     |                   |     |      |
|                  |                               | V <sub>CC</sub> = 4.5 V                                          | -     | 7   | 15  | -                | 19  | -                 | 22  | ns   |
| C <sub>PD</sub>  | power dissipation capacitance | per package; V <sub>I</sub> = GND to V <sub>CC</sub> - 1.5 V [3] | -     | 30  | -   | -                | -   | -                 | -   | pF   |

[1]  $t_{pd}$  is the same as  $t_{PHL}$  and  $t_{PLH}$ .

[2]  $t_t$  is the same as  $t_{THL}$  and  $t_{TLH}$ .

[3]  $C_{PD}$  is used to determine the dynamic power dissipation ( $P_D$  in  $\mu\text{W}$ ):

$$P_D = C_{PD} \times V_{CC}^2 \times f_i \times N + \sum (C_L \times V_{CC}^2 \times f_o) \text{ where:}$$

$f_i$  = input frequency in MHz;

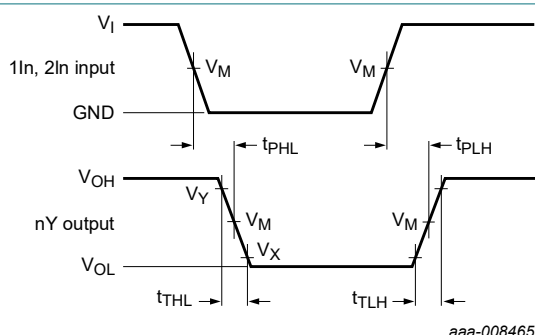
$f_o$  = output frequency in MHz;

$C_L$  = output load capacitance in pF;

$V_{CC}$  = supply voltage in V;

$N$  = number of inputs switching;

$\sum (C_L \times V_{CC}^2 \times f_o)$  = sum of outputs.

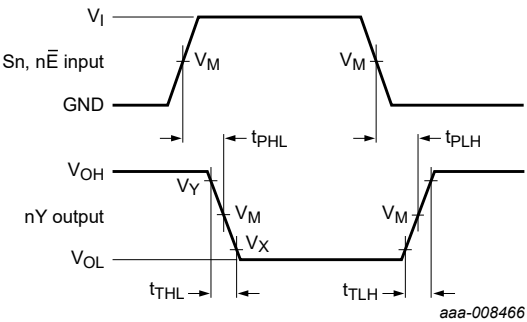


Measurement points are given in Table 8.

$V_{OL}$  and  $V_{OH}$  are typical voltage output levels that occur with the output load.

**Fig. 6. Waveforms showing the input (1In, 2In) to output (1Y, 2Y) propagation delays and output transition times**



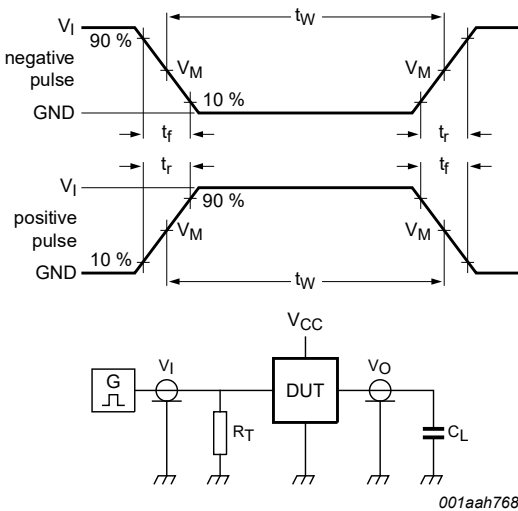


Measurement points are given in [Table 8](#).  
 $V_{OL}$  and  $V_{OH}$  are typical voltage output levels that occur with the output load.

**Fig. 7. Waveforms showing the input (Sn, nE) to output (nY) propagation delays**

**Table 8. Measurement points**

| Type     | Input       | Output      |             |             |
|----------|-------------|-------------|-------------|-------------|
|          | $V_M$       | $V_M$       | $V_X$       | $V_Y$       |
| 74HC153  | $0.5V_{CC}$ | $0.5V_{CC}$ | $0.1V_{CC}$ | $0.9V_{CC}$ |
| 74HCT153 | 1.3 V       | 1.3 V       | $0.1V_{CC}$ | $0.9V_{CC}$ |



Test data is given in [Table 9](#).  
Definitions test circuit:  
 $R_T$  = termination resistance should be equal to output impedance  $Z_o$  of the pulse generator.  
 $C_L$  = load capacitance including jig and probe capacitance.

**Fig. 8. Test circuit for measuring switching times**

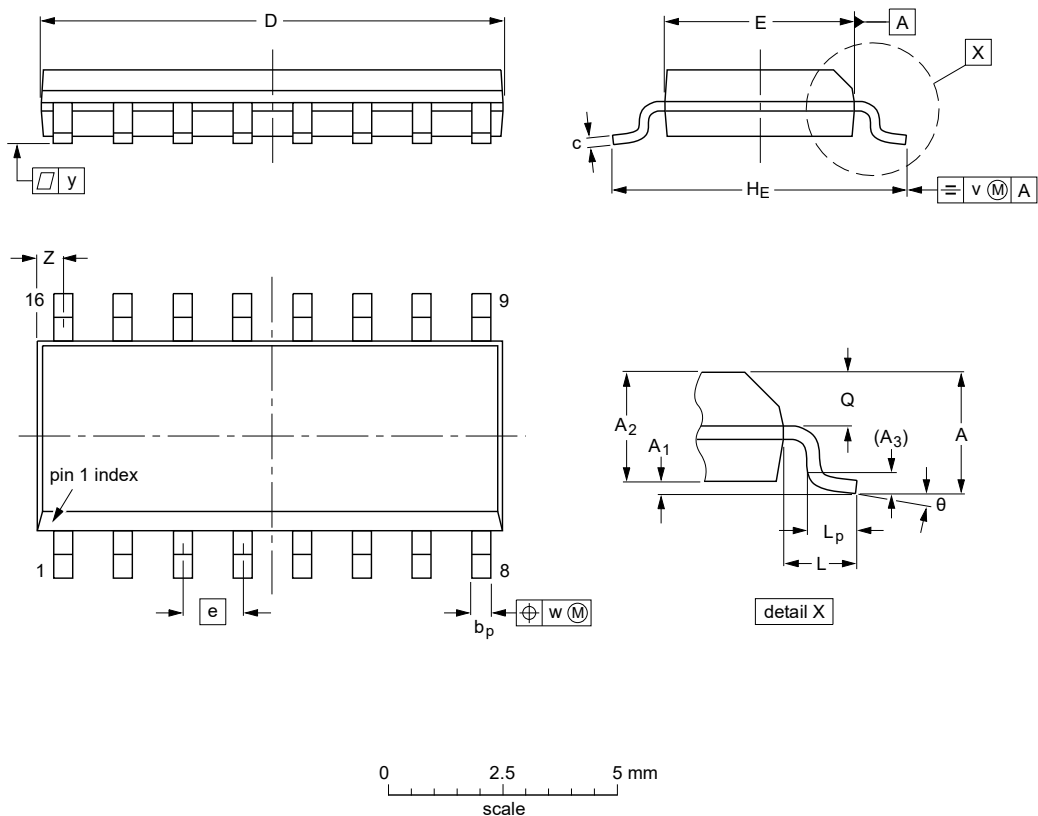
**Table 9. Test data**

| Type     | Input    |            | Load         | Test               |
|----------|----------|------------|--------------|--------------------|
|          | $V_I$    | $t_r, t_f$ | $C_L$        |                    |
| 74HC153  | $V_{CC}$ | 6.0 ns     | 15 pF, 50 pF | $t_{PLH}, t_{PHL}$ |
| 74HCT153 | 3.0 V    | 6.0 ns     | 15 pF, 50 pF | $t_{PLH}, t_{PHL}$ |

11. Package outline

SO16: plastic small outline package; 16 leads; body width 3.9 mm

SOT109-1



DIMENSIONS (inch dimensions are derived from the original mm dimensions)

| UNIT   | A<br>max. | A <sub>1</sub> | A <sub>2</sub> | A <sub>3</sub> | b <sub>p</sub> | c                | D <sup>(1)</sup> | E <sup>(1)</sup> | e    | H <sub>E</sub> | L     | L <sub>p</sub> | Q              | v    | w    | y     | Z <sup>(1)</sup> | θ        |
|--------|-----------|----------------|----------------|----------------|----------------|------------------|------------------|------------------|------|----------------|-------|----------------|----------------|------|------|-------|------------------|----------|
| mm     | 1.75      | 0.25<br>0.10   | 1.45<br>1.25   | 0.25           | 0.49<br>0.36   | 0.25<br>0.19     | 10.0<br>9.8      | 4.0<br>3.8       | 1.27 | 6.2<br>5.8     | 1.05  | 1.0<br>0.4     | 0.7<br>0.6     | 0.25 | 0.25 | 0.1   | 0.7<br>0.3       | 8°<br>0° |
| inches | 0.069     | 0.010<br>0.004 | 0.057<br>0.049 | 0.01           | 0.019<br>0.014 | 0.0100<br>0.0075 | 0.39<br>0.38     | 0.16<br>0.15     | 0.05 | 0.244<br>0.228 | 0.041 | 0.039<br>0.016 | 0.028<br>0.020 | 0.01 | 0.01 | 0.004 | 0.028<br>0.012   |          |

Note  
1. Plastic or metal protrusions of 0.15 mm (0.006 inch) maximum per side are not included.

| OUTLINE<br>VERSION | REFERENCES |        |       |  | EUROPEAN<br>PROJECTION | ISSUE DATE           |
|--------------------|------------|--------|-------|--|------------------------|----------------------|
|                    | IEC        | JEDEC  | JEITA |  |                        |                      |
| SOT109-1           | 076E07     | MS-012 |       |  |                        | 99-12-27<br>03-02-19 |

Fig. 9. Package outline SOT109-1 (SO16)

SSOP16: plastic shrink small outline package; 16 leads; body width 5.3 mm

SOT338-1

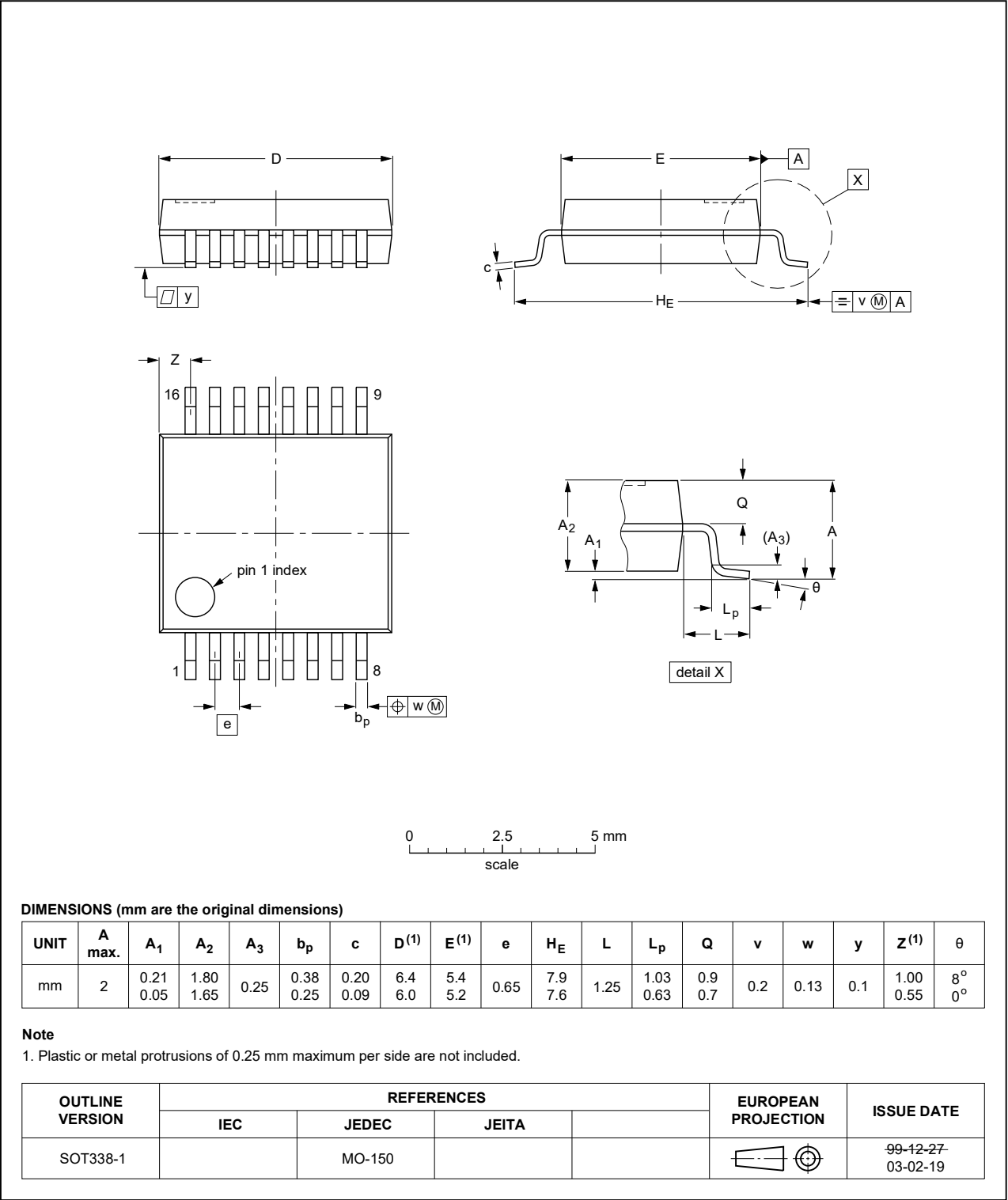
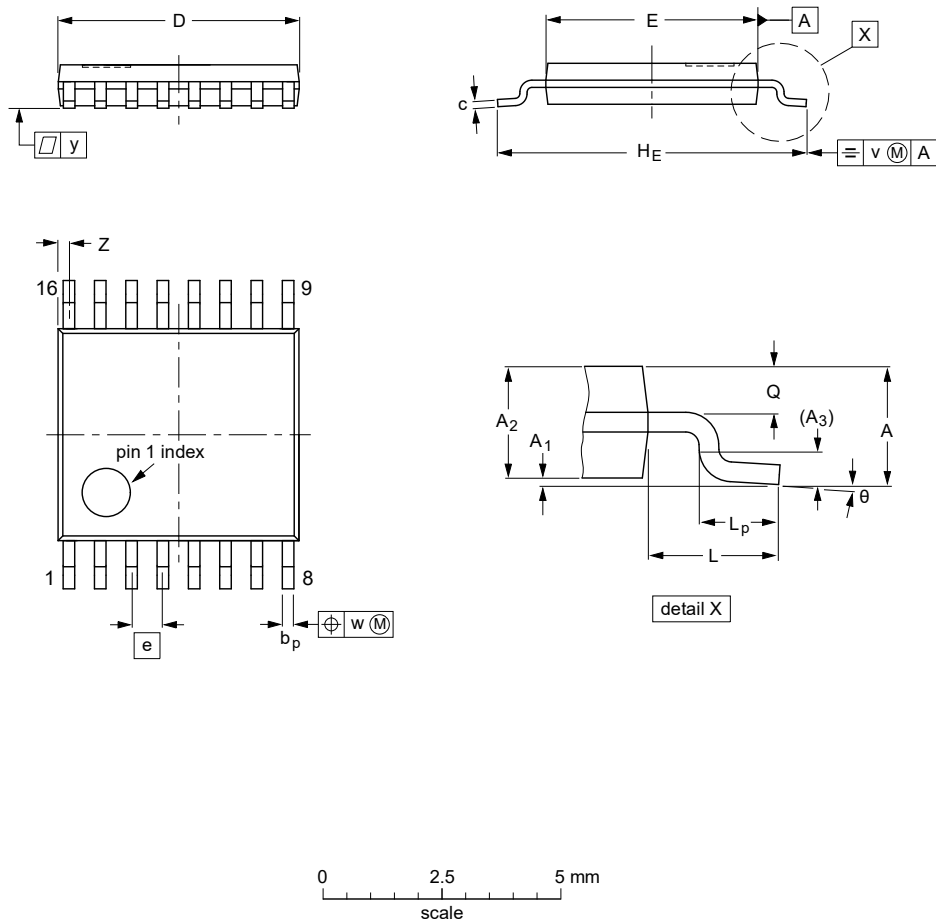


Fig. 10. Package outline SOT338-1 (SSOP16)

TSSOP16: plastic thin shrink small outline package; 16 leads; body width 4.4 mm

SOT403-1



DIMENSIONS (mm are the original dimensions)

| UNIT | A<br>max. | A <sub>1</sub> | A <sub>2</sub> | A <sub>3</sub> | b <sub>p</sub> | c          | D <sup>(1)</sup> | E <sup>(2)</sup> | e    | H <sub>E</sub> | L | L <sub>p</sub> | Q          | v   | w    | y   | Z <sup>(1)</sup> | θ        |
|------|-----------|----------------|----------------|----------------|----------------|------------|------------------|------------------|------|----------------|---|----------------|------------|-----|------|-----|------------------|----------|
| mm   | 1.1       | 0.15<br>0.05   | 0.95<br>0.80   | 0.25           | 0.30<br>0.19   | 0.2<br>0.1 | 5.1<br>4.9       | 4.5<br>4.3       | 0.65 | 6.6<br>6.2     | 1 | 0.75<br>0.50   | 0.4<br>0.3 | 0.2 | 0.13 | 0.1 | 0.40<br>0.06     | 8°<br>0° |

Notes

- 1. Plastic or metal protrusions of 0.15 mm maximum per side are not included.
- 2. Plastic interlead protrusions of 0.25 mm maximum per side are not included.

| OUTLINE<br>VERSION | REFERENCES |        |       |  | EUROPEAN<br>PROJECTION                                                                | ISSUE DATE           |
|--------------------|------------|--------|-------|--|---------------------------------------------------------------------------------------|----------------------|
|                    | IEC        | JEDEC  | JEITA |  |                                                                                       |                      |
| SOT403-1           |            | MO-153 |       |  |  | 99-12-27<br>03-02-18 |

Fig. 11. Package outline SOT403-1 (TSSOP16)

## 12. Abbreviations

Table 10. Abbreviations

| Acronym | Description                             |
|---------|-----------------------------------------|
| CMOS    | Complementary Metal-Oxide Semiconductor |
| DUT     | Device Under Test                       |
| ESD     | ElectroStatic Discharge                 |
| HBM     | Human Body Model                        |
| MM      | Machine Model                           |
| TTL     | Transistor-Transistor Logic             |

## 13. Revision history

Table 11. Revision history

| Document ID         | Release date                                                                                                                                                                                                                                                                                                        | Data sheet status     | Change notice | Supersedes          |
|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|---------------|---------------------|
| 74HC_HCT153 v.8     | 20190813                                                                                                                                                                                                                                                                                                            | Product data sheet    | -             | 74HC_HCT153 v.7     |
| Modifications:      | <ul style="list-style-type: none"> <li>Type numbers 74HC153DB and 74HCT153DB (SOT338-1/SSOP16) added.</li> <li><a href="#">Table 4</a>: Derating values for <math>P_{tot}</math> total power dissipation updated.</li> </ul>                                                                                        |                       |               |                     |
| 74HC_HCT153 v.7     | 20181010                                                                                                                                                                                                                                                                                                            | Product data sheet    | -             | 74HC_HCT153 v.6     |
| Modifications:      | <ul style="list-style-type: none"> <li>The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia.</li> <li>Legal texts have been adapted to the new company name where appropriate.</li> <li>Type numbers 74HC153DB and 74HCT153DB (SOT338-1/SSOP16) removed.</li> </ul> |                       |               |                     |
| 74HC_HCT153 v.6     | 20160511                                                                                                                                                                                                                                                                                                            | Product data sheet    | -             | 74HC_HCT153 v.5     |
| Modifications:      | <ul style="list-style-type: none"> <li>Type numbers 74HC153N and 74HCT153N (SOT38-4) removed.</li> </ul>                                                                                                                                                                                                            |                       |               |                     |
| 74HC_HCT153 v.5     | 20140123                                                                                                                                                                                                                                                                                                            | Product data sheet    | -             | 74HC_HCT153 v.4     |
| Modifications:      | <ul style="list-style-type: none"> <li><a href="#">Table 1</a> and <a href="#">Section 11</a>: all references to 14 pin packages removed.</li> </ul>                                                                                                                                                                |                       |               |                     |
| 74HC_HCT153 v.4     | 20131128                                                                                                                                                                                                                                                                                                            | Product data sheet    | -             | 74HC_HCT153 v.3     |
| 74HC_HCT153 v.3     | 20130722                                                                                                                                                                                                                                                                                                            | Product data sheet    | -             | 74HC_HCT153_CNV v.2 |
| 74HC_HCT153_CNV v.2 | 19970827                                                                                                                                                                                                                                                                                                            | Product specification | -             | -                   |

## 14. Legal information

### Data sheet status

| Document status<br>[1][2]      | Product status [3] | Definition                                                                            |
|--------------------------------|--------------------|---------------------------------------------------------------------------------------|
| Objective [short] data sheet   | Development        | This document contains data from the objective specification for product development. |
| Preliminary [short] data sheet | Qualification      | This document contains data from the preliminary specification.                       |
| Product [short] data sheet     | Production         | This document contains the product specification.                                     |

- [1] Please consult the most recently issued document before initiating or completing a design.
- [2] The term 'short data sheet' is explained in section "Definitions".
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Contents

1. General description..... 1

2. Features and benefits..... 1

3. Ordering information..... 1

4. Functional diagram..... 2

5. Pinning information..... 3

5.1. Pinning..... 3

5.2. Pin description..... 3

6. Functional description..... 4

7. Limiting values..... 4

8. Recommended operating conditions..... 5

9. Static characteristics..... 5

10. Dynamic characteristics..... 7

11. Package outline..... 10

12. Abbreviations..... 13

13. Revision history..... 13

14. Legal information..... 14

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